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EXAMINER
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LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 08/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/883,682

Applicant(s)

PHILLIPS, CORY

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. FIG. 2A is objected to because the designation of “inlet 7a” and “inlet 7b” should be reversed with the designation of “outlet 9a” and “outlet 9b”, respectively, for consistency in the drawings. Also, element “206” should be changed to -- 20b --.
2. FIG. 2A is objected to as failing to comply with 37 CFR 1.84(p)(4) because “9b” has been used to designate both the steam outlet and lower heat exchanger. Likewise, “22c” has been used to designate plural exhaust cover openings.
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign not mentioned in the description: element “23” in FIG. 2C.
4. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

5. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code (see section [0002]). Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.
6. The disclosure is objected to because of the following informalities:
  - In section [0032], line 2, “top or bottom inlet 7a, 7b” should be changed to -- top or bottom inlet 10a, 10b -- , to correspond to the “feed gas inlets”.
  - In section [0041], line 1, “Referring to Figure 2A” should be changed to -- Referring to Figures 1E and 2A -- for proper reference to the drawings. Also, in line 2, “17F 17 R”

should be changed to -- 17f, 17r --.

- In section [0042], line 5, “opening 22” should be changed to -- opening 22a, 22b, ... 22i -- for proper reference to FIG. 2A.

7. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware. Appropriate correction is required.

#### ***Claim Objections***

8. Claims 1, 14, 24 and 31 are objected to because of the following informalities:

- In claim 1, lines 5-6, the phrase “one or more one than one” should be changed to -- one or more than one --. Also, a semicolon (;) should be inserted after “platform” in line 3.
- In claim 14, line 2, the third “of” should be omitted. Additionally, it is unclear as to the separation of the individual elements of the Markush group. The examiner suggests the insertion of a semicolon (;) between elements for clarity in the claim.
- In claim 24, -- the -- should be inserted before “chamber block”.
- In claim 31, -- catalyst selected from the group -- should be inserted after “one or more than one” for proper Markush format.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 3, 5, 6, 8, 9, 12, 13, 15, 23-27 and 29-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject

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matter which applicant regards as the invention.

Regarding claim 3, it is unclear as to the relationship between “an inlet and an outlet of a heat exchanger” and “each heat exchanger having an inlet and an outlet” of claim 1, lines 9-10.

Regarding claim 5, it is unclear as to the relationship between “a chamber block” and “a chamber block”, set forth in claim 1, line 2. Likewise, the relationship between “an outlet of the one or more than one heat exchanger” and “each heat exchanger having... an outlet”, set forth in claim 1, lines 9-10. Likewise, the relationship between “an inlet of the one or more than one cavity” and “the inlet of the one or more than one cavity”, set forth in claim 1, lines 5-6, 14-15.

Regarding claims 6, 8 and 15, it is unclear as to the relationship between “an outlet of the one or more than one cavity” and the cavity outlet set forth in claim 1, line 6.

Regarding claim 9, it is unclear as to the relationship between “an inlet of the one or more than one cavity” and a/the cavity inlet set forth in claim 1, line 6 and claim 2.

Regarding claim 12, “the nominal powder size” lacks proper positive antecedent basis, since applicants must first specify that the catalyst comprises a “powder” before reciting further limitations for the powder (note that “powder” is merely recited in alternative form in claim 11).

Regarding claim 13, it is unclear as to the relationship between “a granular catalyst” and “a catalyst” set forth in claim 10 or the “granule” set forth in claim 11.

Regarding claim 23, the language of the claim is drawn to a method limitation, as it is unclear as to the structural limitation applicants are attempting to recite since “a reaction temperature” is not considered an element of the apparatus.

Regarding claims 24 and 25, it is unclear as to the structural limitation applicants are attempting to recite by, “... [the] chamber block receives reactants at a predetermined pressure,”

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and "... the one or more than one cavity receives the reactants at a pressure of less than 3 atmospheres," since "pressure" is not considered an element of the apparatus.

Regarding claims 26 and 27, it is unclear as to the structural limitation applicants are attempting to recite by, "... configured as a unit with a capacity for use in a fuel cell system rated at ... kW," since "capacity" is not considered an element of the apparatus.

Regarding claim 29, "A large system reactor" is considered vague and indefinite, since "large" is a relative term. Also, it is unclear as to the relationship between "a common exit" and "common exit" set forth in claim 28.

Regarding claims 30 and 31, "low-temperature" and "high-temperature" are considered vague and indefinite, as "low" and "high" are relative terms.

Regarding claim 32, "chamber" (line 2) lacks proper positive antecedent basis.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 2, 10, 11, 16, 17, 19, 23-27 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Bard (US 5,580,523).

Regarding claims 1 and 10, Bard discloses an apparatus comprising one or more than one heat exchanger (i.e., "thermal" type; column 2, lines 38-42); a chamber block (chip unit 100 with chamber 4; FIG. 1a-1d) being charged with a catalyst (i.e., "catalytic" type reaction chambers; column 2, lines 38-42; Example 5); and a platform (assembly board 80; FIG. 3); wherein the heat

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exchanger is aligned with the chamber block (i.e., heater **H** aligned with reactor/chamber block **R** in FIG. 4; also in cases of catalytic and thermal type chip units used together) and comprises first and second opposite sides with micro-channel pathways (column 3, lines 31-50), each heat exchanger having an inlet and outlet (i.e., port openings **8, 9**; FIG. 1c); wherein the chamber block comprises an inlet and outlet (i.e., port openings **8, 9**; FIG. 1c), and a longitudinal cavity (chamber **4**; FIG. 1d) extending from inlet to outlet (via channels **10, 11**; FIG. 1d); and wherein platform **80** defines a closed interior pathway (i.e., channels **81, 82, 83, 84**; FIG. 3) operatively disposed to communicate with the inlet of the cavity in the chamber block.

Regarding claim 2, Bard discloses the platform (i.e., element **20** in FIG. 2) comprises a plate spaced apart from the inlet of the one or more than one cavity of block **100** (i.e., spaced apart by O-rings **40, 41**) to form a fluid flow channel in communication with the cavity.

Regarding claim 11, Bard further discloses the catalyst may comprise “particles” (column 6, lines 64-65), and therefore inherently a powder, granule or pellet, for example.

Regarding claims 16 and 17, Bard (Table 1, column 5; column 3, lines 31-44) discloses cavity dimensions of at least 1 cm (i.e.,  $L = 1.00 \text{ E}+04 \text{ } \mu\text{m}$ ) or less than 2.5 cm (i.e.,  $L = 10 \text{ } \mu\text{m}$  to  $L = 1.00 \text{ E}+04 \text{ } \mu\text{m}$ ).

Regarding claim 19, Bard discloses a plurality of cavities arranged in rows and columns, as inherent of the disclosed, “plurality of interchangeable reaction vessels, alike or different, in parallel or series,” (column 3, lines 45-50; for example, FIG. 3 illustrates 1 row and 3 columns).

Regarding claims 23-25, no further structural limitations are recited since the “reaction temperature” and “pressure” are not considered elements of the apparatus, and therefore the apparatus of Bard meets the claims. In any event, Bard discloses the apparatus is capable of

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regulating reactions conducted under extreme temperatures and pressures (column 3, lines 53-59)

Regarding claims 26 and 27, Bard discloses the apparatus is configured as a unit (i.e., a single module unit; or a unit of a plurality of module units). However, no other structural limitations are recited since “a capacity” is not considered an element of the apparatus, and the claim limitation of, “for use in a fuel cell” is merely a recitation of the intended use, which holds no patentable weight over the cited prior art. The apparatus of Bard thus meets the claims.

Regarding claim 32, Bard discloses in an example a catalytic reactor 605 contains a packed bed of Pt-Al<sub>2</sub>O<sub>3</sub> catalyst (column 9, lines 1-17; FIG. 9).

Instant claims 1, 2, 10, 11, 16, 17, 19, 23-27 and 32 structurally read on Bard.

11. Claims 1, 2, 10, 18, 19, 21 and 23-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Koga et al. (US 5,270,127).

Regarding claims 1 and 10, Koga et al. (FIG. 2, 3, 5; generally, column 5, lines 21-66) disclose an apparatus comprising plural heat exchangers (cooling plates 32); a chamber block (reactor plate 31) being charged with a catalyst (shift catalyst 41); and a platform (comprising plate members 33, masking frames 34, 44); wherein heat exchanger 32 is aligned with chamber block 31 and comprises first and second opposite sides with micro-channel pathways (as defined by the opposite sides of wave shaped fin plate 47; column 5, lines 50-54), each heat exchanger 32 having an inlet 45 and outlet 46 communicating with the pathways on each opposite side thereof; wherein chamber block 31 comprises an inlet 35, outlet 36, and longitudinal cavity (defined by entrance chamber 39, catalyst room 42, and exit chamber 40) extending from inlet 35 to outlet 36; and wherein platform 33, 34, 44 defines a closed interior pathway operatively disposed to communicate with inlet 35 of cavity 39, 42, 40 in the chamber block 31.



Regarding claim 2, Koga et al. disclose platform 33, 34, 44 comprises a plate (i.e., plate members 33) spaced apart from inlet 35 of cavity 39, 42, 40 to form a fluid flow channel in communication with the cavity (see FIG. 2).

Regarding claim 18, Koga et al. disclose the length of the cavity 39, 42, 40 corresponds to the length of the chamber block 31 (see FIG. 2).

Regarding claim 19, Koga et al. disclose a plurality of cavities 39, 42, 40 arranged in rows and columns (i.e., for “n” chamber blocks/reactor plates 31, there would be “n” rows and one column; column 6, lines 8-11).

Regarding claim 21, Koga et al. disclose a plurality of cavities in a staggered (i.e., interpreted as alternating) arrangement (column 6, lines 8-11).

Regarding claims 23-25, no further structural limitations are recited since the “reaction temperature” and “pressure” are not considered elements of the apparatus, and therefore the apparatus of Koga et al. meets the claims.

Regarding claims 26 and 27, Koga et al. disclose the apparatus configured as a unit (FIG. 1). However, no other structural limitations are recited since “capacity” is not considered an element of the apparatus, and the claim limitation of, “for use in a fuel cell” is a recitation of intended use, which holds no patentable weight over the cited prior art. In any event, Koga et al. further disclose the intended use of the apparatus for fuel cell operation (column 1, lines 5-10).

Instant claims 1, 2, 10, 18, 19, 21 and 23-27 structurally read on Koga et al.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 12-14, 18, 20, 21, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bard (US 5,580,523).

Regarding claims 12 and 13, although Bard is silent as to the dimensions of the catalyst particles, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate size for the particles in the apparatus of Bard, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

Regarding claim 14, Bard discloses the example of a Pt/Al<sub>2</sub>O<sub>3</sub> catalyst (Example 5).

Regarding claim 18, Bard discloses, "... chamber 4 is formed by etching the preformed pattern into the substrate... to the extent necessary to form a chamber having *the desired volume*," (column 5, lines 28-31), and further discloses the relationship of various cavity lengths *L* to cavity volumes *V* in Table 1. Although Bard is silent as to whether the length of the cavity may correspond to the length of the chamber block, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate length for the cavity in the apparatus of Bard, on the basis of the suitability for the intended use of achieving a *desired volume*, since it has been held that changes in size involve only ordinary skill in the art. *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955).

Regarding claim 20, Bard discloses "... a plurality of interchangeable reaction vessels, alike or different, in parallel or series," (column 3, lines 45-50), thus inherently forming a given row-column configuration depending on the desired number of reaction vessels selected.

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Although Bard is silent as to whether the rows and columns equal, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select such a configuration in the apparatus of Bard, on the basis of suitability for the intended use of generating a certain capacity, for example. *Concrete Unlimited Inc. v. Cementcraft Inc.* 227 USPQ 784 (Fed. Cir. 1985); *In re Kuhle* 188 USPQ 7 (CCPA 1975).

Regarding claim 21, although Bard is silent as to whether the arrangement of cavities 4 may be “staggered”, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select such a configuration for the apparatus of Bard, since the shifting location of parts was held to have been obvious. *In re Japikse*, 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950).

Regarding claims 28 and 29, Bard discloses “... a plurality of interchangeable reaction vessels, alike or different, in *parallel* or series,” (column 3, lines 45-50). Although Bard is silent as to a common exhaust exit, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to configure the apparatus of Bard as such, on the basis of suitability for the intended use, since the use of manifolds for combining plural effluent streams into a single stream is well known in the art of fluid distribution.

13. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bard (US 5,580,523) in view of O’Brien et al. (US 3,615,217).

Bard discloses “catalytic” type reactor, but is silent as to the recited catalysts. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select such catalysts for the apparatus of Bard, on the basis of suitability for the intended use as a low temperature shift reactor, since such shift catalysts is well known in the art,

as evidenced by O'Brien et al., who teach low-temperature shift catalysts comprising Cu, Zn and Al (i.e., copper oxide/zinc oxide/alumina; Abstract; Ex. IV).

14. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bard (US 5,580,523) in view of Chinchon (US 4,142,988).

Bard discloses a "catalytic" type reactor, but is silent as to the recited catalysts. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select such catalysts for the apparatus of Bard, on the basis of suitability for the intended use as a high temperature shift reactor, since such shift catalysts is well known in the art, as evidenced by Chinchon, who teaches high-temperature shift catalysts comprising the combination of a Group VIA metal, such as Cr or Mo, and a Group VIII metal, such as Fe or Co (column 2, lines 35-59), as well as Al (i.e., in the support; column 3, lines 28-33).

15. Claims 3, 4, 6, 7, 15-17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al. (US 5,270,127).

Regarding claims 3 and 4, Koga et al. disclose a U-shaped configuration for the platform (i.e., reaction plate masking frame 34; FIG. 2), wherein opposite sides of element 34 comprise orifices formed in the extending legs of the U in a direction transverse to the extending legs, the orifices communicating with inlet 35 and outlet 36 of chamber block 31. However, Koga et al. is silent as to whether the platform element in operative correspondence with the inlet 45 and outlet 46 of heat exchanger 32 may further comprise a U-shaped configuration (i.e., heat exchanger masking frame 44 has an L-shaped configuration; FIG. 2). In any event, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate configuration (such as a U-shape) for platform element 44 in the apparatus

of Koga et al., on the basis of suitability for the intended use and absent showing any unexpected results thereof, since changes in shape involves only ordinary skill in the art. *In re Dailey* 149 USPQ 47, 50 (CCPA 1966); *Glue Co. v Upton* 97 US 3, 24 (USSC 1878).

Regarding claim 6, Koga et al. disclose a polyhedron (i.e., a cube; see FIG. 1, 2) with an open side corresponding to the outlet **36** of the one or more than one cavity **39**, **42**, **40**.

Regarding claims 7 and 22, Koga et al. disclose an exhaust cover (exhaust manifold **54**; FIG. 2) covering the open side of the polyhedron, wherein cover **54** comprises a continuous, single exit manifold interconnected with each of the cavity outlets **36**.

Regarding claim 15, Koga et al. disclose the exhaust cover **54** comprises an opening corresponding to an outlet **36** of the one or more than one cavity **39**, **42**, **40** (i.e., the concave side of element **54**, facing outlet **36** of the “n” chamber blocks/reactor plates **31**).

Regarding claims 16 and 17, although Koga et al. is silent as to the dimensions of cavity **39**, **42**, **40**, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select the recited dimensions for the cavity in the apparatus of Koga et al., on the basis of suitability for the intended use, since changes in size involve only ordinary skill in the art. *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955).

16. Claim 11-14, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al. (US 5,270,127), as applied to claims 1 and 10 above, and further in view of in view of O'Brien et al. (US 3,615,217).

Regarding claims 11, 30 and 32, Koga et al. disclose the apparatus may be used as a low temperature shift reactor comprising a low temperature shift catalyst **42d** (FIG. 3; column 6, lines 56-68). However, Koga et al. is silent as to whether catalyst **42d** may comprise the recited

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compounds. In any event, it would have been obvious for one of ordinary skill in the art to select one of the recited compounds for the catalyst in the apparatus of Koga et al. since such compounds are well known in the art as low temperature shift catalysts, as evidenced by O'Brien. The same comments with respect to O'Brien apply. Also, see Example IV, which teaches the catalyst in pellet form.

Regarding claims 12-14, the collective teachings of Koga et al. and O'Brien et al. are silent as to whether the catalyst may comprise the recited dimensions. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate size for the catalyst in the modified apparatus of Koga et al., on the basis of suitability for the intended use, since changes in size involve only ordinary skill in the art. *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955).

17. Claim 11-14, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koga et al. (US 5,270,127), as applied to claims 1 and 10 above, and further in view of in view of Chinchin (US 4,142,988).

Regarding claims 11, 31 and 32, Koga et al. disclose the apparatus may be used as a high temperature shift reactor comprising a high temperature shift catalyst **42u** (FIG. 3; column 6, lines 56-68). However, Koga et al. is silent as to whether catalyst **42u** may comprise the recited compounds. In any event, it would have been obvious for one of ordinary skill in the art to select one of the recited compounds for the catalyst in the apparatus of Koga et al. since such compounds are well known in the art as high temperature shift catalysts, as evidenced by Chinchin. The same comments with respect to Chinchin apply. Also, see column 3, lines 50-68, which teaches the catalyst in small particle or powder form.

Regarding claims 12-14, the collective teachings of Koga et al. and Chinchén are silent as to whether the catalyst may comprise the recited dimensions. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate size for the catalyst in the modified apparatus of Koga et al., on the basis of suitability for the intended use, since changes in size involve only ordinary skill in the art. *In re Rose*, 220 F.2d 459, 463, 105 USPQ 237, 240 (CCPA 1955).

***Allowable Subject Matter***

18. Claims 5, 8 and 9 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Conclusion***


19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Watkins et al., Sanger et al., Collins et al. and Corrigan were cited as relevant documents in the International Search Report of related application PCT/US02/19386.

\* \* \*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung  
August 21, 2003 

  
**HIEN TRAN**  
**PRIMARY EXAMINER**